Space Weather Forecast

Issued on Wednesday 19 March 2025 at 00:38 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate class flares. Chance of G1/Minor Storms days 1-3 (19-21 March) due to coronal mass ejection arrivals.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with only Common-class flares observed in the past 24 hours. There are currently ten sunspot regions on the visible disc. A sunspot region in the northwest is the largest at present, with some minor growth within its intermediate spots. The second sunspot is located in the southeast, which is of a similar size, but along with another region located in the north near-centre disc showing little change. None of the sunspots are showing any significant magnetic complexity, with most relatively stable.

There are currently three main coronal mass ejections (CMEs) which feature in the forecast. All of which may glance or combine to affect Earth in the coming days (19-21 Mar). No other Earth-directed CMEs were observed.

Solar Wind / Geomagnetic Activity: Solar winds were at near background levels, around 400km/s, increasing to elevated levels from 18/1615 UTC, due to the arrival of a glancing CME, peaking at 570km/s. Solar winds have since declined to background levels. Interplanetary Magnetic Field was weak to moderate, with the north-south component also weak to moderate. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with an ongoing chance of isolated Moderate flares.

Solar Wind / Geomagnetic Activity: There are three main CMEs which feature in the forecast in the coming days (19-21 Mar). Solar winds are likely to remain mostly at slow levels with slightly elevated or elevated enhancements probable due to forecast CME arrivals. Quiet to Unsettled activity with a chance of G1-G2/Minor-Moderate storms days 1-3 (19-21 Mar) should any of the three possible CMEs arrive and/or combine.

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels, with a slight chance of enhancement should there be any larger flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	30	30	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	40	40	40	40
Very Active	R3-R5 (X Class)	No	5	5	5	5

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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